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**REMARKS**

The following remarks are in response to the Examiner's statements in the Office Action dated August 8, 2006. Applicants have amended the claims to recite that the structure is rigid or has strength and rigidity and that the cured thermoset layer is also rigid. Support is found at page 5, line 11 and at page 6, lines 1-5. Applicants have amended the thermoplastic layer of claim 27 to be greater than 0.5 mm thickness and is further specifically intended to provide strength, rigidity or integrity to the four layer construction (page 10, lines 14-16; page 1, lines 10-12; and page 5, lines 11-12). As amended, claim 27 is supported by the specification. No new matter has been added.

Claims 43 and 44 have been amended to provide a more definite description of the aspect of claim 27 to which the limitation has been applied. No new matter has been added.

Claim 45 has been amended to properly depend from claim 41, such that the element of a rigid polyurethane foam reinforcement has antecedent basis. No new matter has been added.

Claims 1-26 and 50-72 are withdrawn per the Response to Restriction Action dated December 5, 2005. Claims 29-31 and 42 were previously canceled without prejudice.

The amendments to the specification reflect language already present in claim 27 and thus were made only to clarify discussion of the "cured fiber reinforced thermoset resin composite" element of the invention.

**Rejection under 35 U.S.C. § 103(a)**

In paragraphs 2 through 5 of the Examiner's Action, the Examiner has rejected claims under 35 U.S.C. § 103(a).

In paragraph 2, the Examiner states that claims 27 - 33, 35-40, 44, and 47-49 are unpatentable over Higashi et al., U.S. Patent No. 6,818,302, in light of Figge et al., U.S. Patent No. 4,194,938, because Higashi et al. teach an acrylic layer, an additional layer, and reinforcing contiguous layers and Figge et al. further teach a cured fiber-resin layer. Applicants have reviewed Higashi et al. and Figge et al. and assert that these references teach stretchable or flexible units and do not relate to strong and rigid structural units. None of these references teach or suggest Applicants' invention. Applicants respectfully traverse the rejection.

Higashi et al. teaches a layered thermoplastic sheet that is flexible and stretchable. Figge et al. shows the combination of a thermo-formable sheet and a thin flexible fiber resin layer. The result is a product with no substantial stiffness and strength.

Applicants understand the Examiner's statement to the effect that layers of thermoplastics as set forth in Higashi et al. could be used in conjunction with the cured fiber-resin layer of Figge et al. Such a combination would not obtain a strong rigid unit. The thin, non-structural layers of Higashi et al. would not be expected to increase the strength, rigidity, or structural integrity of the fiber resin layer of Figge et al. Higashi et al. disclose a three layer construction comprising a polypropylene-based layer having a thickness of 10-500 microns (0.010 - 0.5 mm) (Col. 1, line 63 and Col. 3, lines 22-23), a thermoplastic layer having a thickness of 20-400 microns (0.020-0.4 mm) (Col. 1, line 64 and Col. 6, lines 23-24), and an acrylic layer having a thickness of 10-300 microns (0.010-0.3 mm) (Col. 1, line 66 and Col. 6, lines 24-25). The maximum thickness of the combined layers, at 1.2 mm, results in a flexible non-structural material. In contrast, Applicants' amended claim 27 claims a four layer construction comprising a first acrylic layer having a thickness of up to 2.5 mm (2500 microns), a thermoplastic layer having a thickness of greater than 0.5 to 15 mm (500 to 15,000 microns), a third layer, and a fourth layer comprising the cured fiber-resin composite.

The range of thickness of the acrylic layer of Applicants' original claim 27 trivially overlaps with the range of thickness of the acrylic layer disclosed by Higashi et al. However, the thermoplastic layer of amended claim 27 does not. Applicants' thermoplastic layer is greater than 0.5 mm in thickness and is further specifically intended to provide strength, rigidity, and integrity to the overall four layer construction (page 5, lines 11-12, and page 10, lines 14-16). The thermoplastic layer of Higashi et al., at 0.4 mm or less, cannot be expected to increase the strength and integrity of the overall construction incorporating the cured fiber-resin layer of Figge et al.

Further, Higashi et al. specifically disclose that the role of the thermoplastic layer, disposed between the acrylic and polypropylene-based layers, is for design or decorative purposes, such as addition of colorant or a printing layer (Col. 4, lines 40-56). Additionally, in claim 1 Higashi et al. specify that this resin layer has a minimum elongation at break of 100%, suggesting that the role of the thermoplastic layer is not to provide structural integrity,

strength, and rigidity. Rigid materials are associated by the skilled artisan with low elongation at break; an elongation of 100% at break indicates rubbery, not rigid, behavior.

Additionally, the polypropylene-based layer of Higashi et al. is stretchable/flexible and would not be expected to provide strength, integrity, or rigidity to the overall construction. While Higashi et al. teach that the polypropylene layer contains inorganic filler (Col. 2, lines 49-53), a thermoplastic elastomer is also added (Col. 2, lines 53-60). The purpose of the three component layer is to prevent curling during thermoforming, not to increase the strength, rigidity, and integrity of the construction. Elastomers and polypropylene are not materials used by the skilled artisan to impart properties relating to strength, rigidity, or integrity. A skilled artisan would not expect the addition of a filler component to a layer of polypropylene and an elastomer, at a layer thickness of 0.5 mm or less, to be sufficient to impart any additional strength, rigidity, and integrity to the construction of Higashi et al. when present in combination with the fiber-resin layer of Figge et al. Rather, the combination of the Higashi et al. with Figge et al. would result in a construction wherein the fiber-resin layer provided the properties of strength, rigidity, and integrity.

Thus, there is nothing in the combination of Higashi et al. or Figge et al. that suggests using a thermoplastic layer(s) to provide additional strength, rigidity, and integrity to a rigid construction containing a cured fiber reinforced resin layer. This need is not recognized in the prior art. The current invention is therefore not taught or suggested by Higashi et al. when combined with Figge, et al.

Further, the Examiner has pointed to nothing in the combination of Higashi et al. with Figge et al. that suggests the combination of Applicants' invention.

"In establishing a *prima facie* case of obviousness under 35 U.S.C. § 103, it is incumbent upon the examiner to provide a reason why one of ordinary skill in the art would have been led to modify a prior art reference or to combine reference teachings to arrive at the claimed invention."

*Ex Parte Nesbit*, 25 USPQ2d 1817,1818 (BPAI 1992) (internal citations omitted).

The requisite motivation must stem not from the Applicants' disclosure, but from some teaching, suggestion or inference in the prior art. *Id.* Here, there is no suggestion by the combination of Higashi et al. with Figge et al. to combine a fiber-resin composite layer with

a layered construction comprising three layers, the middle layer of which is designed to provide strength, rigidity, and integrity to the overall construction. The implication of Figge et al., instead, is that the cured fiber-resin layer provides these properties to the layered construction. No further need for additional strength, rigidity, or integrity is suggested.

All the remaining claims are dependent on claim 27 and thus include the limitation of the combination of a cured fiber reinforced thermoset composite layer with a layered construction comprising three layers, the middle layer of which is designed to provide strength, rigidity, and integrity to the overall construction. Claims 29-31 are canceled. Applicants submit that the subject matter of claims 27, 28, 35-40, 44, and 47-49 is not obvious under 35 U.S.C. § 103(a) in light of Higashi et al. in light of Figge et al. and respectfully request withdrawal of the rejection.

Further, claim 28 sets forth an additional limitation to the thermoplastic layer of claim 27, by providing for the acrylic polymer to be the outside layer. While Higashi et al. does claim a laminate wherein the acrylic layer is the outside layer (claim 4), the acrylic layer is not disposed on a laminate having a thermoplastic layer that provides additional strength, integrity, and rigidity to the construction. Such a layered structure is not taught or suggested by the combination of Higashi et al. with Figge et al. Therefore, the outermost layer of acrylic resin of claim 28 is not taught or suggested by the combination of Higashi et al. in combination with Figge et al.

Further, claim 32 sets forth an additional limitation to the thermoplastic layer of claim 27, providing for a range of thickness of 1.5 mm to about 15 mm. This claim further differentiates Applicants' invention from Higashi et al. and Figge et al., because the thickest layer in the Higashi, et al. construction is 0.5 mm for the polypropylene layer. The thicker thermoplastic layer in Applicants' invention will provide additional strength, integrity, and rigidity to the construction when compared to a thermoplastic layer of less than 1.5 mm. As discussed above, this role of the thermoplastic layer is not taught or suggested by Higashi et al. in combination with Figge et al. Therefore, claim 32 is not obvious in light of the combined references.

Further, claim 33 sets forth an additional limitation to the construction in that the acrylic and thermoplastic polymers must be in the form of a laminate. While Higashi et al. claim a laminate in general, the laminate of an acrylic polymer with a thermoplastic polymer

having a thickness effective to provide strength, rigidity or integrity to the structure, wherein the thickness of the thermoplastic layer is greater than about 0.5 to about 15 mm, is not taught or suggested by Higashi et al. in combination with Figge et al. Therefore, claim 33 is not rendered obvious in light of the combined references.

Further, claim 35 depends from claim 33 and so is a further limitation on the laminate structure of claim 33. Claim 33 further differentiates Applicants' invention from Higashi et al. by requiring that the combination of acrylic and thermoplastic layers is thermoplastic overall. Nothing in Higashi et al. or Figge et al. teach such a limitation, wherein one of the layers is designed to provide strength, rigidity or integrity to the structure and has a minimum thickness greater than 0.5 mm. As discussed above, this role of the thermoplastic layer is not taught or suggested by Higashi et al. in combination with Figge et al. Therefore, claim 35 is not rendered obvious in light of the combined references.

Further, claims 36-40 are drawn to articles that are formed of the shaped and layered construction set forth in claim 27. There are no claims drawn to articles specifically formed using the laminates of Higashi et al. or the constructions of Figge et al. Higashi et al. suggest that the laminates are "not limited as to shape" and that the shape should be determined according to the application (Col. 8, lines 48-53). However, Higashi et al. point to no particular physical properties that make the claimed laminates appropriate for any particular application. In contrast, the overall structure of Applicants' invention as described in claim 27 is specified to be suitable for a bathroom tub, tub surround, or spa (claim 36); a motor vehicle component, specifically a hood, trunk, door, trunk lid, or tonneau (claims 37 and 38); a component of a boat (claim 39); or a component of a recreational vehicle (claim 40). Applicants' construction is specifically suitable to these challenging applications because it not only comprises a fiber reinforced thermoset layer, but also has an additional thermoplastic layer designed to provide additional strength, rigidity and integrity to the structure. Nothing in the combination of Higashi et al. and Figge et al. suggests this combination of layers nor the use of these layers to form vehicle or tub components. Therefore, claims 36-40 are not rendered obvious in light of the combined references.

Applicants note that the claim 44 has been amended to more definitely set forth the component of claim 27 to which claim 44 is drawn. No new matter has been added. As amended, claim 44 is drawn to the structure of claim 27 wherein the cured fiber reinforced

thermoset resin composite layer is comprises glass fiber. While Figge, et al. claims the use of glass fiber cloth in claim 2, there is nothing the combination of Higashi et al. with Figge et al. that teaches or suggests the combination of glass fiber reinforced thermoset resin composite with the structure of Applicants' invention, wherein one of the layers is designed to provide strength, rigidity or integrity to the structure and has a minimum thickness greater than 0.5 mm. As discussed above, this role of the thermoplastic layer is not taught or suggested by Higashi et al. in combination with Figge et al. Therefore, claim 44 is not rendered obvious in light of the combined references.

Further, claim 47 depends from claim 46. The Examiner did not assert that claim 46 is rendered obvious in light of the combined references of Higashi et al. with Figge et al. Therefore, claim 47 cannot be said to be rendered obvious in light of the combined references because it represents a further limitation to claim 46.

Further, claims 48 and 49 are drawn to Applicants' invention as set forth in claim 27, wherein the structure further comprises an installation aperture (claim 48) or an attachment flange (claim 49). Neither installation apertures nor an attachment flanges are taught or suggested by any aspect of the Higashi et al. or Figge et al. references. As noted above, Higashi et al. suggest that the laminates are "not limited as to shape" and that the shape should be determined according to the application (Col. 8, lines 48-53). However, Higashi et al. point to no particular physical properties that make the claimed laminates appropriate for any specific application. In contrast, the overall structure of Applicants' invention as described in claim 27 is specified to be suitable for use with an installation aperture or an attachment flange. Further, it is not obvious to include an installation aperture or attachment flange in combination with a construction of Higashi et al. in combination with Figge et al. without some suggestion to do so. Therefore, claims 48 and 49 are not rendered obvious in light of the combined references.

In light of the foregoing arguments, Applicants submit that the subject matter of claims 27, 28, 35-40, 44, and 47-49 is not obvious under 35 U.S.C. § 103(a) in light of Higashi et al. in light of Figge et al. and respectfully request withdrawal of the rejection.

In paragraph 3, the Examiner states that claims 34 and 43 are unpatentable over Higashi et al. and Figge et al. in view of Wanat et al., U.S. Patent No. 6,852,405. Applicants respectfully traverse the rejection. Wanat et al. do not supply the disclosure missing from the

combination of Higashi et al. with Figge et al. of the combination of a cured fiber reinforced thermoset composite layer with a layered construction comprising three layers, the middle layer of which is designed to provide strength, rigidity, and integrity to the overall construction.

Applicants further submit that Wanat et al. do not teach the use of ABS polymers to impart adhesion between layers of a laminate, as is set forth in Applicants' claim 34. Rather, Wanat et al. teach the use of butyl methacrylate - methyl methacrylate copolymer as an additive to an acrylic polymer layer in order to gain adhesion of the acrylic layer to a high impact polystyrene (HIPS) layer (Col. 2, lines 59-65). Wanat et al. teach the use of ABS, in contrast, as a one of a number of listed structural plastics over which the capstock laminate of the invention may be placed (Col. 6, lines 22-63).

When combined with Higashi et al. and Figge et al., Wanat et al. do not teach or suggest the use of ABS to provide adhesion between a thermoplastic layer and a fiber reinforced thermoset layer. Rather, Wanat et al. specifically teaches adhesion of acrylic polymer to structural plastics, the preferred structural plastic being HIPS (Col. 6, line 64).

Applicants note that the claim 43 has been amended to more definitely set forth the component of claim 27 to which claim 43 is drawn. No new matter has been added. As amended, claim 43 is drawn to the use of a cured unsaturated polyester resin as a component of the cured fiber reinforced thermoset resin composite. The element of a cured unsaturated polyester resin is not found in Wanat et al. No adhesive properties are provided by the use of the polyester resin; rather, it is a thermosetting material that provides the expected strength to the construction of Applicants' invention. The use of polyester as part of the cured fiber reinforced thermoset resin composite of Applicants' invention is not rendered obvious by the combination of Higashi et al. and Figge et al. with Wanat et al.

In light of the foregoing arguments, Applicants submit that the subject matter of claims 34 and 43 is not obvious under 35 U.S.C. § 103(a) by the combination of Higashi et al. and Figge et al. with Wanat et al. and respectfully request withdrawal of the rejection.

In paragraph 4, the Examiner states that claims 41, 42, 45, and 46 are unpatentable over the combination of Higashi et al., Figge et al., and Wanat et al. in view of Motoi et al., U.S. Patent No. 6,605,343. Claim 42 is canceled. The Examiner asserts that Motoi et al. teach foamed polyurethane reinforcement in laminated structures, thereby rendering their use

in the current application obvious. In light of amended claim 27, Applicants respectfully traverse the rejection of claims 41, 45, and 46. Motoi et al. do not supply the disclosure missing from the combination of Higashi et al., Figge et al., and Wanat et al. of a four layered construction comprising a cured fiber reinforced thermoset composite layer and a thermoplastic layer designed to provide strength, rigidity, and integrity to the overall construction.

Motoi et al. teach the use of polyurethane foam reinforcement in laminated structures. However, the combination of Higashi et al., Figge et al., and Wanat et al. with Motoi et al., does not teach the combination of polyurethane foam reinforcement, a fiber reinforced thermoset layer; a layer of acrylic polymer, ASA or ABS-acrylic alloy; a layer of thermoplastic designed to provide strength, rigidity, and integrity to the overall construction; and a layer of acrylic. Therefore, the combination of references does not teach all the claim limitations of claim 41. Further, nothing within the cited references suggests using combining the four layered construction of claim 27 with a rigid polyurethane foam reinforcement.

Applicants note that claim 45 has been amended to more definitely set forth the component of claim 27 to which claim 45 is drawn. Further, claim 45 now properly depends from claim 41 and so represents a further limitation on claim 41. No new matter has been added. As amended, claim 45 is drawn to the rigid polyurethane foam reinforcement of claim 41, and adds the limitation that the rigid polyurethane foam reinforcement is disposed within the cured fiber reinforced thermoset resin layer of claim 27. Because of the arguments set forth for claim 41, claim 45 is not obvious in light of the combination of Higashi et al., Figge et al., and Wanat et al. with Motoi et al.

As to claim 46, Applicants note that the limitation to claim 27 of the inclusion of a structure including a substantially planar surface adjacent to one angle of about 85° to 105° is not a limitation found in any of the four cited references. Therefore, because of the arguments made above, claim 46 is not rendered obvious in light of the combination of Higashi et al., Figge et al., and Wanat et al. with Motoi et al.

In light of the foregoing arguments, Applicants submit that the subject matter of claims 41, 45, and 46 is not obvious under 35 U.S.C. § 103(a) by the combination of Higashi



et al., Figge et al., Wanat et al. and Motoi et al. and respectfully request withdrawal of the rejection.

In view of the above amendments and remarks, Applicants have rendered all claims allowable, and respectfully request a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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Date

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